LEARNING FROM THE UNIVERSAL EXPERIENCE OF CITIES:

Best Practices for Sustainability

A RESEARCH-BASED THESIS

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SUMMARY OF RESEARCH-BASED THESIS

LEARNING FROM THE UNIVERSAL EXPERIENCE OF CITIES:
Best Practices for Sustainability

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This research-based thesis is investigating the universal experience and arcology of cities as it relates to sustainability. Research indicates there are certain fundamental characteristics that concretize each city. For this research paper, case studies were conducted to: 1) identify the universal experience of cities, 2) identify how social order affects the physical design of arcology, and 3) provide best practices for future planning and development. Case studies were used to identify fundamental characteristics of early cities in Mesopotamia and Europe. Following previous research done by Joel Kotkin, Spiro Kostof, the United Nations, and Paolo Soleri these findings were extracted: 1) cities must have a central identity from which to direct their vision and development, 2) physical form and social order affects one’s experience of a city, and 3) a city’s form and social order directly contributes to its sustainability. A strategic approach for future planning practice is offered based on these findings, with recommendations that can feasibly be implemented into new or existing cities.
ACKNOWLEDGEMENTS

The direction of my study was inspired by Paolo Soleri and his work in the creation of arcology. “An environment in harmony with man” became Soleri’s noble goal as he coined the vision “arcology” (Soleri, 2001). Soleri believed the city was a cradle for mankind, whose materialistic ways have destroyed it.

Several other influential visionaries contributed to my understanding and research of cities: Joel Kotkin, Spiro Kostof and Constantinos Doxiadis. Their work in understanding and defining the universal experience of cities has inspired me to continue my research and further my education in the field of city planning.

Special thanks goes to Bruce Race, my research advisor and professor who supported my interests in planning sustainable communities.
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1.1 PROBLEM AND SETTING

The main purpose of this investigation is to explore whether or not principles guiding the universal characteristics of cities and arcology can lead to a more sustainable city. Understanding these ideologies will lead to “best practices for sustainable development”. The research direction originated from an interest in the design strategies from Paolo Soleri.

The over-utilization of the earth’s natural resources has sparked global concern regarding climate change. Therefore, greater emphasis has been placed on alternative and more sustainable urban patterns and lifestyles. Many underdeveloped or undeveloped countries are feeling left behind and want to live “the American Dream”. However, the earth could not survive everyone emulating western lifestyles. This study focuses on ways to make cities more sustainable, with the research focusing on historical western world cities.

1.1.1 Changing Scenes.

One of the main struggles civilizations face today is increasing population, including land-intensive development patterns that are common in the U.S. and are now being emulated by developing countries. “The American Dream” is to own property, have a loving family, and separate work from leisure. These are all ideas
idealized from popular television shows - like *Leave it to Beaver, Ozzie and Harriet, Father Knows Best*, and others – portraying the American family as a perfect congruent entity living on earth.

The Cleaver family never thought through the negative effects of sprawling communities, rise in transportation costs, or the over utilization of natural resources, all problems faced today in the United States. Our sprawling nature, enabled by zoning, is leading to the overconsumption of the earth. Douglass Farr (2008) writes, “Modern consumer society, for instance, exploits natural resources at a rate that the Earth cannot sustain” (Farr, 2008, p. 25). Furthermore, “Low density development results in the highest per capita demands on natural systems and habitats…the lower- density development resulted...per capita increases in impervious land cover, miles driven, water use, energy use, air pollution and greenhouse gas production” (Farr, 2008, p. 25).

The desire to live in these low-density suburban developments is depicted by David Rusk in an analysis of population shifts from urban to suburban areas [Figure 1.1]. The percent change in suburban area growth from 1950-2000 has increased 384% while central cities only saw a 29% increase during the same time period. Additionally, there is a 46% total decrease in population density per square mile indicating a shift in land use from urban to suburban areas (Hudnut III, 2008, p. 27).
The United Nations released a report indicating the world population increased 2.5 billion from 1950 to 2000. The world population is expected to reach 8 billion in 2025, an increase of 2 billion in a 25 year span [refer to Appendix C for world population projection map] (United Nations Department of Economic and Social Affairs, 2002). The rise in population increases the need for housing, food, and natural resources; therefore, increasing the strain on the planet. The United Nations reported,

Environmental stress has often been seen as the result of the growing demand on scarce resources and the pollution generated by the rising living standards of the relatively affluent. But poverty itself pollutes the environment, creating environmental stress in a different way. Those who are poor and hungry will often destroy their immediate environment in order to survive...they will overuse marginal land; and in growing numbers
they will crowd into congested cities...On the other hand, where economic growth has led to improvements in living standards, it has sometimes been achieved in ways that are globally damaging in the longer term (United Nations General Assembly, 1987, p. 40).

In 2002 there were approximately .41 acres of arable land per capita in East and South Asia. The growing population has increased the number of mouths to feed and reduced the amount of arable land. In 2002, approximately 11 percent of the world’s land surface was used for crop production, while there is little room for expansion in places like South Asia, East Asia and Europe who are seeing the greatest increases in population [refer to Appendix D] (United Nations Department of Economic and Social Affairs, 2002).

1.1.2 Map of Despair

In 1942, Constantinos Doxiadis introduced ekistics, the relationship between human life and the natural setting of man’s environment in the Universe. The notion of ekistics calls for an understanding of human nature in conjunction with their environment (Ekistics, 2010). In developing this concept, Doxiadis optimized the quality of man’s relationship with his environment through five categories: nature, man, networks, society, and shells¹ [refer to Figure 1.2].

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¹ For further information regarding the five categories of Ekistics refer to Ekistics, the Science of Human Settlements. (1970, October). *Science* (no. 3956), 393-404.
Figure 1.2: Model of Ekistics.
Data Source: (Ekistics, the Science of Human Settlements, 1970)

It is through ekistics that Doxiadis modeled the “map of despair” [refer to Figure 1.3]. The map of despair is his depiction of the Earth’s fabric. The shaded area represents the built environment while the open areas represent the “left-over natural environment.” As civilizations develop, they consume the natural environment through surface development. As the Earth’s population increases, so will the gross consummation of its resources.

Figure 1.3: Map of Despair
Data Source: Google images Ecumenopolis Doxiadis 2 World Map

1.1.3 Understanding Terminology

This thesis is investigating the universal experience and arcology of cities as it relates to sustainability. Therefore, throughout this thesis the terms ‘universal
experience of cities’ and ‘arcology’ refer to the characteristics of cities that form the basis for sustainability. The term ‘sustainability’ is broadly defined by the United Nations as “meeting the needs of the present generation without compromising the ability of future generations to meet their needs” (United Nations General Assembly, 1987, p. 43). The 2005 World Summit, in an attempt to further depict sustainability, established the “three pillars of sustainability” [Figure 1.4] as environmental, social and economic (United Nations General Assembly, 2005). This model indicates a correlation between the environment, mankind, and the economy.

The U. S. Environmental Protection Agency (EPA), in 1970, created the National Environmental Policy Act (NEPA) which established a national goal for humans and nature to “...exist in productive harmony, and fulfill the social, economic and other requirements of present and future generations...” (US Environmental
Redefine Cities 7

Protection Agency, 2010). This is a goal which planning practices should imitate on an intimate level, a common goal of Doxiadis and Soleri.

For the purposes of this thesis, sustainable practices should be understood as ‘those practices that account for, or contribute to, a city’s duration.’ Sustainable practices are not to be confused with common phrases like ‘green building’ or ‘LEED development practices.’ Such techniques and applications may contribute to a city’s duration in one form or another, but will not be the focus of this thesis.

1.2 WORKING TOWARDS A SOLUTION

Today we find the American public, as well as the general world public, concerned with the impacts of current development and lifestyles. There have been numerous articles, books, and discussions about redefining our planning strategies, but very little discussion on changing social behaviors and patterns when addressing sustainability. Some strategies implemented are the Kyoto Protocol (see Footnote 2) and the Earth Charter (see Footnote 3).

Soleri, paralleling concepts by Doxiadis and the United Nations, directs our efforts into one main concept in creating a workable solution to “the map of despair:” arcology, the fusion between man and his environment. Arcology builds on Constantinos Doxiadis’ notion of ecumenopoly by creating optimal urban environments that contain everything anyone could ever need. A cruise liner could

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be described as the closer ancestor to one of Soleri’s Arcologies. Chapter 2 will
discuss Soleri’s vision for a better congruence between nature and man along with
setting a contextual basis for the universal experience of cities.

1.3 RESEARCH-BASED THESIS FOCUS

This research-based thesis is intended to connect several theories about our
universal experience with cities and their contribution to sustainability. Case studies
of self-sustaining cities over long periods of time are used to depict the universal
experience. The case studies will focus on western-world cities since these have
been recorded in existence for hundreds and thousands of years. Centuries of
documented cities have provided insight about the universal experience and
sustainability. The short lifespan of most American cities will contribute very little
to the overall aims and objectives.

![Figure 1.5: Research Model](image)

Researching cities as case studies is intended to address the following three
questions:
1) How is sustainability addressed in the universal experience of cities?

2) How does the physical form and social order affect the universal experience of cities?

3) How does a city's form and social order contribute to its sustainability?

This research-based thesis will support the conclusion that “cities develop at different times and places,” and emphasize the ‘time-space model of understanding cities,’ which is addressed in Chapter 5.

1.4 RESEARCH AIMS AND OBJECTIVES

This research-based thesis investigates the universal experience and arcology of cities in an attempt to understand how a city can sustain. The scope of this research is to explore the universal experience of cities; the practices or influences that shape design; compare cities through the visions of Kotkin, Kostof, Soleri and Doxiadis; and determine how planners can benefit from their understanding of cities. Because of the broad range of subjects, the focus will be on understanding cities through a condensed set of universal characteristics defined by the above mentioned researchers. The characteristics include: 1) Kotkin’s sacred, safe and busy; 2) city duration; 3) Kostof’s design of city; 4) social & urban hierarchy; and 5) and Soleri’s city’s vision. Specific objectives are to: 1) identify the universal experience of cities; 2) identify how social order affects the physical design of arcology; 3) determine how aim one and two contribute to a city’s sustainability; and 4) provide best practices for future development. By accomplishing these objectives and aims, this
investigation will increase understanding regarding behaviors utilized in current and previous planning practices.

**1.4.1 Objective One: Identify the universal experience of cities**

Objective one focuses on the works of Joel Kotkin in defining cities as sacred, safe, and busy. It is generally accepted that historic cities typically developed from religious origins. Emperors, religious leaders, and kings generally held the cities’ power and vision, therefore determining a cities fate. They controlled the land, the wealth, and the armies to protect and sustain in their environment. Understanding how these rulers succeeded or failed has led to my research. The main purpose of this part of the investigation is to determine if Joel Kotkin’s theory of sacred, safe and busy are determining factors in a city’s sustainability. The *working hypothesis* for this section is that cities must adhere to Kotkin’s theory to stand the test of time, but the context of sacred, safe and busy must evolve as civilizations as a whole evolve.

**1.4.2 Objective Two: Identify how social order affects the physical design of a city**

Objective two focuses on the works of Paolo Soleri on his concept of arcology. This section of the investigation emphasizes how social order contributes to a city’s sustainability. Taking research learned from Soleri, the city’s vision, and interaction with nature strongly correlate to its sustainability. The *specific hypothesis* is that the social order depicted from man’s mental fabric can determine the fate of a city.
1.4.3 Objective Three: Determine how aim one and two contribute to a city's sustainability

Objective three attempts to relate objective one and two in determining the sustainability of a city. Utilizing case studies and previous historical research, principles will be examined and extracted as alternatives to current planning practices. The specific hypothesis is that factors extracted from objectives one and two can contribute to a positive change in current planning practices; therefore, reducing the negative effects of surface building.

1.4.4 Objective Four: Provide best practices for future development

Objective four attempts to provide ‘best practices’ for future development and planning. Understanding the impacts of our universal urban experience on our common ecology is vital to creating and allowing change. Continued research is needed to educate the general public and planners on how they can rectify the negative effects of poor planning. This section will direct future research and provide recommendations for future planning to promote not only a city’s sustainability, but how mankind's aspirations contribute to ecological health of the planet.

1.5 SUMMARY AND STRUCTURE OF RESEARCH-BASED THESIS

The above arguments and hypotheses suggest we could learn from demographers, historians, and environmentalists like Soleri, Kostof, Kotkin and Doxiadis. Taking lessons derived from further investigation and research, society as a whole can start to understand the impacts of development on ecology.
Understanding how cities function and operate based on a community's vision and social behaviors can direct people to change how they live, and begin to mold a brighter future for the generations to come. *The purpose of this thesis is to identify how planners can learn from the universal experience of cities and how they contribute to a city's sustainability.* The remaining chapters are organized as follows:

**Chapter 2  Literature Review**

This chapter summarizes the extant literature, conceptualizing theories presented by Kotkin, Kostof and Soleri. The first section of the review focuses on Kotkin theory; sacred, safe and busy. The second section of the review discusses Kostof’s nine characteristics of cities. The final section presents objectives of Soleri’s Arcologies.

**Chapter 3  Methodology**

This chapter summarizes the case selection process and methodology used in researching regions and cities. It also discusses the presentation of case studies.

**Chapter 4  Case Studies**

This chapter investigates historical information from four regions outlining two cities per region. The first section looks at Mesopotamian origins, then European, Islamic and Asian origins. Five questions are asked to standardize the material presented. The final section looks at Soleri’s Arcologies Arcvillage I and Novanoah II.
Chapter 5  Summary Conclusions

This chapter summarizes the information presented throughout this thesis providing “best practices for sustainable cities.” The first section groups information presented in the previous chapters. The second section identifies “best practices for sustainable cities.” The final section provides direction for future research efforts.
CHAPTER 2
LITERATURE REVIEW

2.1 SCOPE

Throughout history, many societies searched for a utopian vision that would result in a congruous environment (environment in harmony with man). Soleri believes to manifest utopia, society must be on equal ground; therefore, slums, segregation, monopolies, and design must be in harmony, and of equal stature. According to Soleri, once this is achieved, only then can man be happy within the full-fledged “coordination” of city and suburban expanse (Soleri, 2006, p. 9).

The critical end of the thesis is to confute this construction of a congruous environment; as such a hope is not feasible. The idea of utopia is too detached from the social and physical environment humankind has created. Man’s inherent nature to dominate will always prevail under current conditions. It is in changing these conditions that mankind can begin to change his dominance over the world.

The constructive end of this thesis is not to find a cure-all answer for the future of development and planning. As with Soleri, the objective is to clarify,

...some of the elementary processes by which the life of man and society seem to evolve, and then, using these concepts, the effort to define broadly some concrete organism coherent to the platform of the fundamentals reached, a platform regarded as historically valid (Soleri, 2006, p. 9).
Understanding research and theories from Kostof, Soleri, and Kotkin about the history of cities will define the universal experience, along with social indicators of mankind’s dominance over the world, in an attempt to create fundamental planning techniques to drive future development and city planning, which allows for city sustainability.

2.2 SCHOOLS OF THOUGHT ON CITY CREATION

There are many examples throughout history that can provide concrete evidence in support of one or more methods used for understanding how cities came to be: surplus, economic factors, religion and/or evolution. Lewis Mumford saw city evolution as “stage theory.¹” The objectivity of which element, or grouping of elements, led to city materialization has been theorized by numerous scholars, and some are outlined below.

2.2.1 Surplus

The idea of surplus as city development process involves a shift away from a self-satisfying village economy. Villagers of yesteryear, like people today, have unique talents and craftsmanship. The emancipation from land labor through surplus allowed some villagers to express those talents, given there were still farmers to work the field and create the surplus. The argument Kostof (1991) makes is, “surplus production presumes irrigation, and efficient irrigation systems presume a complex bureaucracy, and that means cities.” On the other hand it is

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likely that social institutions might precipitate changes in technology and complex notions about surplus rather than the other way around.

2.2.2 Market Factors

Jane Jacobs outlines a slightly different method of city creation in *The Economy of Cities* (1969) theorizing cities developed as nodal markets. Jacobs believed agricultural intensification followed as a need to feed the city. The caveat to her theory is that some cities did not need or have a market. Treaties carried out by official traders regulated long-distance trade. Furthermore, local markets, when they did exist, did not always develop into cities (Kostof, 1991).

2.2.3 Religion

Many scholars, including Kotkin, have theorized the city is a holy place, protected by armies and walls, and commanded by god. Evidence reveals some civilizations chose city location based on cosmic alignment to particular constellations; “to architecturally mirror the heavens in order to assist in the harmonization of the earth and the stars” (Gray, Places of Peace and Power). While shrines may not always create a city, religious origins are often significant.

2.2.4 Summary

The critical end of this section is that no matter the reason or basis for city development, there are quintessential aspects that motivate city creation. It could be religiously based, commercially based, politically based, or safety based. The necessary end is that cities exist with the acceptance of numerous characteristics. It is in understanding those characteristics that we can define the possibility of
sustainability. It is not one particular element that drives city creation. The question should not be whether the city created the market or the market created the city; it should be what characteristics are present, and how do they contribute or take away from city sustainability?

2.3 THEORETICAL FRAMEWORK: Sacred, Safe, and Busy

In an attempt to define a theoretical framework from which to begin my research, I turned to Joel Kotkin. His description of the “Universality of the Urban Experience” creates a vantage point from which an understanding of cities can be derived. Kotkin believes cities “represent the ultimate handiwork of our imagination as a species, testifying to our ability to reshape the natural environment in the most profound and lasting ways” (Kotkin, 2005, p.xx). According to Kotkin, they are the greatest creation of humankind.

2.3.1 Background

Kotkin introduces a generalization about what characterizes successful cities. He states, “Since the earliest origins, urban areas have performed three separate critical functions – the creation of sacred places, the provisions of basic security, and the host for a commercial market.” The degree of these characteristics may vary, but the concept remains true. More often than not, the weakness in these three aspects has led to a city’s eventual decline (Kotkin, 2005, p. xvi).
2.3.2 Sacred, Safe & Busy

Since the earliest of times, religious structures, cathedrals, mosques, temples, and pyramids have long dominated the imagination of cities. The concept created is a connection between the city and God – creating a sacred place. They served as the earliest primitive “skyline,” a tribute to the gods. Some early examples of these primitive “skylines” were ziggurats and the shrine at Ur of Nannar, which towered seventy feet over the flat Mesopotamian landscape. These connections to God dominated what might be called the “inner city.” Kotkin indicates, “These structures lent the whole district a sense of divine protection and security” (Kotkin, 2005, pp. 4-5). They were the protectors and connectors of palace rulers and principle citizens.

Kotkin argues a fundamental leg for city stability and sustainability lies in the role of security. “Cities must, first and foremost, be safe” (Kotkin, 2005, p. xxii). Many cities arose as places of refuge from marauding nomads. Once the city walls were penetrated, early civilizations collapsed, or they were altered to meet the needs of the conquering society (Kotkin, 2005, p. 11). At its height, Babylon must have seemed impenetrable with its city walls so thick two chariots could ride side
by side on top of them, but on a night in 539 B.C.E. it fell, virtually without a fight. A Persian conqueror named Cyrus the Great penetrated the once prosperous city crippling a leg of city stability causing Babylonians to abandon the city.

Freedom from invading civilizations coupled with the construction of sacred structures stimulated commercial growth, the busy activity Kotkin refers too.

Priests and temples alone cannot sustain large populations; they can only offer a leg for which to stand on. An active economy of artisans, merchants, working people, and sometimes slaves are required to create and sustain large populations and cities. Throughout history, this concept remained prevalent. Kotkin (2005, p. 13) argues,

The entrepreneurial class is often assumed to be the critical, if not dominant, shaper of a vital urban area. Yet in the ancient world, even when merchants and artisans accumulated considerable wealth, power remained concentrated in the hands of priests, soldiers and bureaucrats.

It is with these commercial centers, the presence of trade, and the expansion of commerce, that cities are able to thrive.

2.3.3 Interpretations of Kotkin Theory

The sacred, safe, and busy model can be applied as one method to understanding how cities came to prosper and sustain over time, but the context of this concept has evolved over time. It is important to note that each city is unique and develops at its own pace. Some societies are evolved; some are evolving; and others have yet to evolve at all. These are only representations for understanding
the evolution of most cities. Each city must develop and evolve based on its own duration and structured place.

Using Kotkin’s universal experiences of the city, three models have been created to represent how sacred, safe, and busy has changed throughout time. The first model, known as the early model, viewed religion as a dominant factor for city growth. The second model introduces government as a replacement for religion. The current model shifts from government to shared and cultural identity as a central focus for downtown living. Each model is provided and summarized in the subsequent paragraphs.

**Early Model.** Early cities were centered on a religious structure. Similar to early Babylonian cities, Harappa, and Mohenjo-Daro placed monumental religious architecture at their core. “In China, around 1700 B.C., the Shang dynasty rulers placed temples at the center of their urban spaces” (Kotkin, 2005, p. 7). The idea of a religious core supplemented by the presence of priests or shamans made the city holy or created a presence of a holy connection.
The design and location of cities played an important role in providing safety for its residents. Early Mexico City, circa 1519, was built in the mountains on lakes crowned by a circle of volcanic peaks (Kotkin, 2005, p. xix). The landscape can provide a means of defense just as a city wall can. Steep slopes, rough terrain, and rocky shores were often sought out by settlers as ideal locations for new settlement.

The role of commerce is created and sustained by artisans, marketplaces and surplus. A world economy had not been established yet, so marketplaces and trading were done locally to support the adjacent communities. With a creation of surplus, citizens were able to sell their talents, and use their imaginations to develop technology; thereby, potentially increasing the quality of life for everyone.

**Middle Model.** The middle model, or secular city, was created with the separation of church and state. Our communities became secular, but the church was not completely removed from thought. Religion is no longer the deciding factor for human development in this model. Ordinances and laws now dictate expansion and social order.
The incorporation of formal armed forces, coupled with a police force, begin to replace the need for moats and walls. There is still a threat from invading forces, but with social alliances, and increasing technology, many reasons for war are outdated. It is with this model, society witnesses a change from protecting the core from outside to protecting the core from those within.

The city experiences an increase in commerce through increases in technology. Developed countries start envisioning global economies and expand trade. Technology and industrialization become the deciding factor in sustainability and survivability of cities. Counties with historical significance will further enhance their economy through tourism and services. The idea behind this model is that increased technology has provided the stimulant to increase a city’s economy.

**Current Model.** The current model replaces the sacredness of a place with identity and meaning. The government is still influential in determining design and social order, but people are reliant on meanings and identity, as a means to live in the city. The expanding suburban market provides alternative means to city life. The
cost of living is typically higher within city limits; therefore, the city resident must create a desire to live there.

The sense of safety comes from both inner and outer threats. The emphasis on safety comes from not only policing and armed forces, but from the neighborhood itself. People are crime deterrents, so an active neighborhood and street will reduce crime. The sense of safety is determined by the level of fear residents feel. One change to Kotkin’s depiction of safe comes from shared experiences. In the middle model, citizens still fear threats by invading forces from neighboring cities, but in the current model, most invading threats come from outside country borders. There is still a concern for safety from within city limits; protection comes from policing forces, similar to the middle model. The shared experience comes from unified cities and countries. This is extremely prevalent in today’s society after the tragic incident on September 11th, 2001 that destroyed the twin towers in New York. Americans today fear more threats from Middle Eastern countries than from states within the country’s borders.

The busy nature of a city creates a demand for increased marketplace activity. Expansion in technology and trade increases a city’s wealth and stature in the global market. The expansion of the global market allows developed countries and cities to thrive and sustain. The biggest change between this model and the middle model comes from urban hierarchy. In the middle model, the urban hierarchy ranges within a country’s borders, but in the current model, an urban hierarchy can take a global stance. Cities like Beijing, Chicago, London, and New York influence the
development of underdeveloped, or undeveloped, cities by outsourcing jobs and resources.

2.3.4 Summary

Kotkin's basis of city sustainability through the sacred, safe, and busy model provides an interesting take on social status dictating duration of existence. Early cities were formulated on religious preferences. A city’s identity was centered on a religious structure, or foundation. It was safeguarded by an army, and it provided wealth from local agriculture sold, or traded, in markets.

The next prominent change in cities evolved with the separation of church and state. Governments became the central authority for cities rather than religion. Religion was not cast out, only controlled to an extent. The new focal point for most evolving cities came from high-rise buildings, not religious structures. The army formed separate branches to prevent access to invading armies from air, land, and sea threats, while police forces secured domestic matters. The market evolved using technology and supported a larger trading base.

The new and current model of Kotkin theory has evolved from religion to government to meaning. The government still holds power in our cities, but the development of marketplaces on global levels has changed the style of living. As more and more people developed larger and larger amounts of revenue from international expansion, the cost of living rose. With this increase in cost, people are finding it harder and harder to live in urban areas. The result is conveniently designed highways and attractive suburbs. The only issue is over convenience, and
development can cost money. This convenience coupled with a high cost of city living has resulted in citizens needing a shared cultural identity, or meaning, to want to live downtown. Additionally, the police force has increased in size to support growing populations and sprawling development, but only if a community can support the cost. We also see the addition of neighborhood watching or “eyes on the street” as Jane Jacobs (1961) would allude to.

2.4 UNIVERSAL APPLICATION: Spiro Kostof

After analyzing theories presented by Kotkin, the next step in understanding the universal experience of cities comes from Spiro Kostof. Kostof describes the city as an artifact in his book *The City Shaped: Urban Patterns and Meanings Through History*. The main emphasis of this book is derived not only from human behavior, but from urban form as well. He writes,

> What concerns me has to do with how and why cities took the shape they did.

> Which is to say that I am not engaged with form in the abstract, or with form studied for its behavioral possibilities, but with form as a receptacle of meaning (Kostof, 1991, p. 9).

2.4.1 Background

Kostof discusses the city as an artifact that produces a universal experience for society. He feels urban design is an art that must pay lip service to human behavior. His writing places special emphasis on social implications of urban form (Kostof, 1991, p. 9). In an attempt to further understand the social implications of a city,
Kostof discusses nine characteristics of a city. These characteristics form the universal application of a city [see Figure 2.5].

**2.4.2 Nine Characteristics of a City**

**Energized Crowding.** “Cities are places where a certain energized crowding of people takes place.” This is in reference to settlement density not absolute size or numbers. The vast majority of pre-industrial towns were considered small: consisting of 2,000 people or less. A town or city of around 10,000 would be noteworthy. In the Holy Roman Empire only about 12 to 15, of the almost 3,000, towns had a population over 10,000. As time passed, cities and populations grew, but under a centralized state rule. Without a ruler, the city was bound to wither and collapse (Kostof, 1991, pp. 37-38).
Urban Clusters. Cities are somewhat reliant on one another. Kostof (1991, p. 38) argues, “A town never exists unaccompanied by other towns.” Therefore, it is inevitably locked in an urban system creating an urban hierarchy. Even the smallest of towns has its dependent villages. It becomes the fundamental essence of trade and public relations. In China, an urban hierarchy was expressed in the names of towns. *Fu* for a town meant first order, *chu* was one step down and *hieu* was the next step lower. Sometimes it can be expressed in population size. During the 16th century, Ottoman Anatolia had a clearly defined urban hierarchy headed by Istanbul. Regional centers of about 20,000 to 40,000 inhabitants each had lower-order towns of under 10,000 to 5,000 inhabitants. These urban clusters relied on one another to survive (Kostof, 1991, p. 38).

Physical Circumscription. J.-F. Sobry wrote in his *De l’architecture* of 1776, “Une ville sans mur n’est pas une ville” (a city without walls is not a city). Cities are places that have some physical circumscription to separate those who belong in the urban order and those who do not. If a city does not have a clearly defined physical circumscription, there is generally a legal perimeter which restrictions and privileges apply (Kostof, 1991, p. 38).

Differentiation of Uses. In a city, people are craftsmen or soldiers or priests. In a city there are differentiations of work. In a city, the wealth is not equally distributed amongst the citizens. The differentiation of work creates a social hierarchy; the rich are more powerful than the poor, the priest is more important than the artisan. There is also a social heterogeneity present between races, ethnic
groups, and religions. The original Yoruba cities were intended to be ethnically homogeneous, but slaves or transient traders were still present (Kostof, 1991, pp. 37-41).

**Urban Resources.** Kostof (1991, p. 38) believes, “cities are places favored by a source of income - trade, intensive agriculture and the possibility of surplus food, a physical resources like a metal or a spring (Bath), a geomorphic resource like a natural harbor, or a human resource like a king.” The city provides a central place for the collection and redistribution of resources.

**Written Records.** Cities must rely on written records. Through written records, cities establish laws to govern the community, tally their goods, and establish titles for property ownership. The final analysis of a city rests on a construct of ownership (Kostof, 1991, p. 38). The indoctrination of written records allows for a city to be governed. A codified law provides a framework for social order.

**City and Countryside.** Cities are intimately engaged with their countryside. They have a territory that feeds them, and in return, the city offers protection and provides services. Kostof (1991, p. 38) believes, “the separation of town and country...is thoroughly injudicious.” He supports this statement by saying, “Roman towns do not exist apart from the centuriated land roundabout; great Italian communes like Florence and Siena could not exist without their contado; and the same is true of New England towns and their fields and commons” (Kostof, 1991, p. 38). The rural systems of land division were often locked to city-form. The Romans
commonly correlated their main coordinates of the centuriation (refer to footnote 2) with the cross-axes of the city. There is much debate over which came first, the town or the countryside. The fundamental realization that Kostof tries to make is that regardless of which came first, they both exist and both are reliant on the other (Kostof, 1991, pp. 38-39).

**Monumental Framework.** Every city has a monumental definition. There is more to a city than just a blanket of residences. This monumental design distinguishes one city from the next; it distinguishes the inner core from the outer core. A monumental definition could come from public buildings that define the city scale, or citizenry landmarks that establish a common identity. Monuments could be technological like the aqueducts of Rome, the Anuradhapura hydraulic system in Sri Lanka, or the Tikal, a large manmade reservoir created during Mayan rule (Kostof, 1991, p. 40).

The early cities, ruled or governed by a central authority, generally chose to monumentalize a palace or a temple. In a secular city, or people’s city as Kostof eludes to, the “princely palace disappears, or is translated into a palace of the people, and a temple is ‘secularized’ - that is the case of the Greek polis” (Kostof, 1991, p. 40). It is with this monumental framework that a city defines its character, values, and beliefs.

**Buildings and People.** The very essences of cities as places are the buildings and people in it. Kevin Lynch (1981, p. 36) wrote, “City forms, their actual function,
and the ideas and values that people attach to them make up a single phenomenon.” Kostof agrees this with this statement. The combinations of both aspects create the city. Kostof argues Mayan cities like Angkor Thom and Nakhon Pathom were not real cities because they had no resident population, yet scholars believe them to be extremely advanced for their time. It all depends on how you define a city. Kostof (1991, p. 40) continues by stating, “we will be well served...to recognize that there have been city-less societies and times when cities were vestigial marks in a predominantly rural landscape.” It was often a contending social system that separated the urban and pastoral way of life. “...The history of human settlement must be predicated on a rural-urban continuum and the city as a self-contained unit of analysis must be seen as a conditional enterprise” (Kostof, 1991, p. 40). The city is not a city if it doesn’t have buildings and people.

2.4.3 Summary

It is in understanding these nine characteristics of a city that Kostof attempts to define the universal application, or experience, of a city. Each of the nine characteristics pay homage to the social implications a city creates. The monuments that define a city, the buildings and people that occupy it, the differences of uses through created or implied hierarchies, the urban-rural connection that supports the function of a city, the linkage between cities dependent upon another, and the written records that serve as a legal basis for doing such. These are the aspects that create, control and define the city as an artifact.

James Vance put it best,
The most enduring feature of the city is its physical build, which remains with remarkable persistence, gaining increments that are responsive to the most recent economic demand and reflective of the latest stylistic vogue, but conserving evidence of past urban culture for present and future generations (Vance, Jr., 1978, p. 134).

At the same time

Urban society changes more than any other human grouping, economic innovation comes usually most rapidly and boldly in cities, immigration aims first at the urban core forcing upon cities the critical role of acculturating refugees from many countrysides, and the winds of intellectual advance blow strong in cities... (Vance, Jr., 1978, p. 134).

2.5 **SOLERI’S SCHOOL OF THOUGHT**

Soleri builds upon the processes and theories provided by Kotkin and Kostof by approaching city development from a social aspect. Soleri describes the impact of mankind on the environment.

2.5.1 **Background**

This next section attempts to shed light on the fundamentals presented in Soleri’s concept of Arcologies. The theoretical framework behind arcology will be discussed through the introduction and explanation of complexity, miniaturization and duration. Only after this concept has been presented can Soleri’s work truly be understood. His take on mankind’s effect on the environment adds the needed social paradigm support in understanding how cities sustain.
2.5.2 Complexity-Miniaturization-Duration Paradigm

Soleri discusses three basic parameters when determining the sustainability of humankind. Those parameters are complexity, miniaturization, and duration. They embody the physical form of future city development. It is through these parameters that mankind will be afforded the ability to prosper. The ignorance of these parameters will result in despair.

**Complexity.** The nature of organisms, life, and existence is ever intensifying and intricate. “The make-up of the process is infinitely complex and ever intensifying” (Soleri, 1987, p. 11). It is through complexity that nature thrives. “Many events and processes cluster wherever a living process is going on” (Soleri, 1987, p. 11).

Take for example the lifecycle of a tree. A tree’s lifecycle begins with germination. An adult tree will drop a seed to the ground during the fall season, and the seed will lay dormant until spring. As the seed receives warmth, water, sunlight, and oxygen it will initiate the growth of a tree embryo, thus beginning the lifecycle. The new tree will sprout a root, seek out groundwater, and stem toward the sun. Too many sun-dried days will cause the seedling to die, but if conditions are favorable a tree can form. As water collects in the roots, a tree will grow. During the fall season a tree will shed its leaves and prepare for winter. The process eventually repeats itself as the tree matures into adulthood. As multiple trees develop and form the basis for a forest, natural disaster controls over population with wildfires. It is necessary for this process to occur to preserve the Earth’s natural cycle and
beauty. It is through the destruction of these forests that fresh, new tree reproduction can occur.

The complexity of tree reproduction and germination describes the nature of humankind in relation to the planetary cycle. This is representative to the map of despair, which is indicative of humankind’s desire to exploit the Earth for all it is worth. In this regard, Earth is the cradle for mankind. Mankind seeks to evolve and adapt through the complexity of urban development. If the Earth is exploited to serve mankind’s interests, it will recycle to ensure survivability.

Sometimes mankind overexploits the Earth, and non-renewable resources are lost. It has become the cycle of life on Earth for all organisms. The incremental complexity of evolutions pulsatory behavior has devised a process from the outreaches of space to the smallest clusters of organisms; "...the unending and spare cosmic existence to geological matter, ...from geological matter to organic stuff, ...from organic to organism, ...from organism to animality, ...animality to reflectivity (man)” (Soleri, 2006, p. 12). Therefore, “The greater the complexity, the greater the spatial and temporal obstacles to performance. Thus the necessity of fitting more into less, both spatially and temporally speaking, is proportionally better” (Soleri, 2006, p. 12). This idea is called miniaturization.

**Miniaturization.** “Society is still an awkward animal suffering from a kind of ‘flat gigantism’ that nails it to the surface of the earth” (Soleri, 2006, pp. 10-11). It is from this mentality that the need for miniaturization is created. Miniaturization calls for the reversal of sprawled development. Condensing development and reducing
other negative effects of poor planning give meaning to the idea of miniaturization. Only when such issues are addressed can the effects outlined in Doxiadis’ map of despair be rectified.

The complexity of nature demands the rigorous utilization of all resources; therefore, when complexity is at work, miniaturization is mandated. It becomes part of the process. The key to incipient life has been miniaturize-or-die. Following Soleri, one might anticipate that miniaturize-or-die is the sine qua non for the development of social, collectively contained towns or cities of the future. Our continued pattern of development will eventually lead to society’s demise. “This occurrence is not just the key to success but the aim evolution has put to itself at this conjuncture of history” (Soleri, 2006, p. 10).

All organisms are complex, compact and are congruent within them forming a miniaturized universe within the organisms’ makeup. This should be the basis for future city development. Soleri feels society needs to understand this concept of miniaturization and move toward conceptual operation. “The superanimal constituting society has not undergone the miniaturizing metamorphosis, and it is by this very nature totally unprepared for the performance of its designated task” (Soleri, 2006, p. 12).

Society must formulate and deliver congruence through developmental equity between society and the natural. Society must discontinue sprawling development that destroys the natural environment. Compact congruent cities must cater to the needs of both society and the natural. Mankind expands society, or the megalopoly,
that causes harm to the environment. “It is poisoned by the wastes it profusely produces and cannot expel...Its miniaturization will make the difference between our confirmation or our death” (Soleri, 2006, p. 13).

**Duration.** “Duration is when the complete evolutionary sequence registered in the past when awakened in the self-revelation that the becoming may eventually generate” (Cosanti Foundation, 2005). The disorderly display of durational fragments is memory. Full duration is the exact and exacting recollection, if the past is the whole of reality. “There could not be duration in a reality not animated by the M.C. ‘methodology’” (Cosanti Foundation, 2005).

Duration simply indicates a city’s ability to survive over time. It also refers to a society’s ability to stretch their reign from period to period, generation to generation. Duration is, “A possible resolution of ‘living time’ is the metamorphosis of time into pure duration, i.e. the eventual ‘living outside of time’” (Soleri, 1987, p. 11). The duration of Mayan civilization was nearly 3,000 years. The capacity to live in congruent, miniaturized complexity allowed for their lasting survival.

**2.5.3 Social Discourse**

Soleri (2006, p. 13) believes, “Society is founded on equity and is constructed on congruence.” Man has a peculiar ability for doing “wrong.” It is for this reason equity is specific to the human species. Congruence is present in nature. “In a sense it is nature itself because her working is a constant coordination of disparate things into congruous patterns” (Soleri, 2006, p. 13). Mankind’s ability to destroy the nature ends automatic congruence. “Most of man’s deeds are governed instead by
antagonistic rules: love and hatred, enlightenment and obscurantism, peacefulness and belligerence” (Soleri, 2006, p. 13).

It is from this reasoning we determine man is not created equally. The Declaration of Independence would argue to the contrary, however, such a man-made identity is not what Soleri believes to true. “Man is not created equal because he is not created but evolved” (Soleri, 2006, p. 14). This is not to disprove a religious discourse, but to objectively offer another truth. Man has adapted and evolved since the beginning of existence. “One of the consequences of inequality is the endless variety of expression by which the stringently organized species of man goes on seeking its own plentitude” (Soleri, 2006, p. 14). It is through this understanding we truly accept man’s ability to destroy the natural through self-preservation and self-fulfillment.

Soleri (2006, p. 14) defines planning as, “The grouping of the configuration, the result of all the elements of investigation, analysis, data collecting, and data processing in references to a particular set of stresses.” He believes there is a particular planning of nature and of man. Man plans by constant extrapolation. He does this by constantly pushing the boundary of complexity to infinity. The need is derived from his lack of duration on earth and desire to conquer.

In the context of environmental planning,

A valid renewal plan for a city can hardly be conceived if the mind does not have a stored-up vision of what the possible can offer under optimal conditions, or the actual problem is not put in theoretical perspective where
in each of the man facets takes light from a unique focus…” (Solari, 2006, p. 14).

Simply stated, how can mankind overcome a chaotic social discourse of destroying and exploiting the earth if he does not understand his repercussions? How can he plan for a new, better society and city if he does not plan under optimal conditions? “The city is the cradle and the expression of civilization, and materialistic society has all but destroyed the city” (Solari, 2006, p. 14). Man plans on speculation. It cannot be an aim; it must be an instrument to the city. Man must care for that which he creates. It cannot be a handout by “authority” because the handout never cares.

The care of the citizen is the sap of the city. But one can care only for that which one loves. Lovableness is the key to a living city. A lovely city is not an accident, as a lovely person is not an accident (Solari, 2006, p. 14).

2.5.4 Summary

It is through this understanding that man can work toward congruence. Society must work against racism, bigotry, greed, and fear. In combating these perceived social stigmas, society can work toward equity and congruence on a global level. The fair treatment and perception of all individuals will lead to miniaturization. “A good social and economic precongruence does not correspond to a general global congruence, that congruence which relates man not only to his social and economic milieu but also to the whole earthly (ecological) environment” (Solari, 2006, p. 13).
It is not enough to end war; we must end war against earth. We must plan with the natural while working to preserve and enhance the earth’s natural beauty. “The city is a human problem that has to find its answer within the ecological awareness” (Soleri, 2006, p. 15).
CHAPTER 3
METHODOLOGY

3.1 RATIONALE FOR STUDIES

The literature review in the previous chapter generally provided support for the major hypothesis underlying this investigation, namely that: 1) early cities are characterized as sacred, safe and busy to promote sustainability, 2) the physical form or characteristics of a city are determinate of its sustainability, and 3) there are social and physical elements affecting the sustainability of cities. Together they form a need to understand social and physical characteristics of a city to promote sustainability.

It is generally accepted that a multitude of factors can determine a city’s success or failure, but it stems from an overall vision. Understanding each city’s unique context and vision provides a basis for city development. For example, a city based on the auto industry will develop for the automobile. A city vision based on walkability will emphasize compact, walkable developments. Funding will be generated based on this vision, and can be the root of its success or failure.

The first step in realizing the determinants for success and failure come from understanding the city’s history. This chapter will provide the basis for case study selection and the methods of interpretation. Chapter 4 outlines the cases and aims to accomplish the following: 1) provide a framework for a city’s vision during
different periods of time, 2) provide rationales for sustainability under the universal experience of cities theory, and 3) determine if a city's form and social order contribute to its sustainability.

3.2 CASE SELECTION

In conducting case study selection, general searches and reading regarding religious centers, economic capitals, and city duration led to the selection of 10 cities for further study. This section outlines the case selection process and presentation of material studied (see Figure 3.1).

3.2.1 Case Selection Process

Kotkin and Kostof have devoted a considerable amount of time to understanding the universal experience of cities, and how the physical form contributes to a city’s sustainability. The information provided in their research formed a great starting point for case studies in this research-based thesis. Kotkin discussed city origins using Babylon, Crete, and Rome as catalysts for his sacred,
safe, and busy theory. Additionally, he briefly mentions London, Damascus, Beijing, Delhi, and Jerusalem in his research. Kostof took a look at city form and evolution in his research. His research includes major cities like Beijing, Mecca, London, Constantine, Angkor, Berlin, and others. The two scholars’ research was very extensive and incorporated numerous cities; therefore additional research was needed to narrow the selection.

Searching further into Kotkin’s theory returned the top 10 most religious cities in the world. They were Mecca, Lhasa, Bethlehem, Varanasi, Vatican City, Haifa, Salt Lake City, Jerusalem, Pushkar and Medina (Hyland, 2009). Another search of the top 5 most sacred cities returns these city results: Jerusalem, Mecca, Vatican City, Varanasi and Bodhgaya (Huang, 2008).

When asking what makes a city sustainable, it is important to research cities that have been in existence for thousands of years. This led to a search for those cities which have been continuously inhabited. The results were numerous, but led to a separation of regions. It was deemed important to consider cities from separate regions when trying to understand the universal characteristics of cities, and how they lead to sustainability. Figure 3.2 shows the separation of regions used in this research-based thesis.
The next step was selecting global economic cities. Several searches for the top 10 Most Global Cities revealed New York, London, Tokyo, Paris, Hong Kong, Chicago, Los Angeles, Singapore, Sydney, and Seoul (Peck, 2010). The final step in selecting case studies was to pick two cities in the four outlined regions: European, Mesopotamian, Islamic, and Asian. Figure 3.3 outlines the cases selected and top “fundamentals” for determining the selection as they relate to the research questions.
Additionally, providing a couple concept designs from Soleri’s Arcologies help to conclude the research by providing characteristics of future development. Soleri’s designs are only concepts, but provide some universal experiences themselves. Most of his work is concluded from studying his drawings and sketches. Arcvillage I and Novanoah I & II are briefly outlined and identified in Chapter 4. These Arcologies were selected to demonstrate how cities can be built in any environment, and for a multitude of population sizes.

3.2.2 Presentation of Information

The following chapter will outline the four regional origins: Mesopotamian, European, Islamic, and Asian. Each regional origin will outline two cities using questions derived from theories presented in Chapter 2. The questions of inquiry are designed to: 1) identify the city’s founding vision using Kotkin’s sacred, safe, and
busy theory, 2) identify how the city's vision was influenced, 3) determine how the physical or built environment was influenced by the city's vision, 4) determine if a city's duration contributed to its sustainability, and 5) identify how social order contributes to a city's sustainability.

The final section, a brief functionality of Soleri's Arcologies Arcvillage I and Novanoah II will be introduced to demonstrate alternative building methods. Since Arcologies are conceptual city alternatives, the above questions of inquiry will not generate the results needed for this research-based thesis. Therefore, the brief functionality will emphasize regional capacity, city visions, fundamentals needed, and urban form.

3.3 METHODS OF INTERPRETATION

This section is intended to provide a basis for the types of research conducted. There are several types of research methods utilized in the following case studies. The research conducted is analytical in nature. It uses facts already available, and analyzes those facts to make a critical evaluation of the material.

It is also qualitative because it examines the history of a region/city rather than creating statistical data in searching for an understanding of human behavior, and the reasons that govern such behavior. Additionally, because no new data is created through surveys or personal observation, the research is secondary.

It is a summary, collection, and/or synthesis of existing research. This research is also fundamental and conceptual. Previous theories guide the research, and are
generally concerned with the formulation of a theory. The case studies presented in the next chapter can be easily understood when applying the above principles.
CHAPTER 4
CASE STUDIES

4.1 INTRODUCTION TO CASE STUDIES

This section introduces each case study by providing a general understanding of the basis behind creating a particular city, and how that city evolved, in an attempt to understand what makes a city sustainable. The information is based on historical references that generate a common understanding for the subject. However, it is important to note the dates presented are close approximations based on one or more researcher's inquiries; therefore, the dates are not as pertinent as the concepts deduced from the research. This section aims to provide support for the major research aims that historically cities can be classified under Kotkin's sacred, safe, and busy theory; that social order affects physical design, as Soleri believes; physical design contributes to a city's sustainability, as Kostof outlines; and future planning practices can be extracted from dissecting a city's universal experience. The case studies below will be examined by asking the following questions:

1. How would Kotkin classify the city’s founding vision?
2. How was the city’s vision influenced?
3. How has the city’s vision influenced the physical form or built environment?
4. How did the city’s duration contribute to its sustainability?

5. How has the city’s social order contributed to its physical form and sustainability?

4.2 MESOPOTAMIAN ORIGINS

It is believed the first “proto-cities” were created in the Mesopotamian region from small villages consisting of artisan activities and trade. The Mesopotamian region, or the “Fertile Crescent,” extended from the west coast of Palestine to the Nile Valley in Egypt to the Tigris and Euphrates rivers (Kotkin, 2005, p. 3). The rivers fed from the Armenian mountain ranges, running through the “Fertile Crescent” to the Persian Gulf (see Figure 4.1). The river banks are frequently steep and difficult to navigate. The climate of the region is semi-arid with a vast desert expanse in the north which gives way to a region of marshes, lagoons, mud flats, and reed banks in the south (Steele, 2007).

![Figure 4.1 Mesopotamian Region Data Source: (St.Just, 2010)](image)

The religious significance or opportunity for commercial expansion and development of wealth must have been great because the area generally lacked
building stone, timber and precious metals. Civilizations relied heavily on long
distance trade when constructing their masterpieces (Kramer, 1971). The
availability of food from the Fertile Crescent could have been enough to attract a
growing population, too.

It is important in Mesopotamian times to understand the social hierarchy from
which these “proto-cities” were ruled. During this era, kings were the noble rulers of
the city. The next tier society was the priests. They were very influential in
determining daily activities of a city’s inhabitants. They were “commanded by the
gods” in the most general sense, and respected by the kings and general population
alike. “Priests set the calendars that determined times for work, worship, and
feasting for the entire population” (Kotkin, 2005, p. 4). One might make an argument
that priests were the city rulers, and kings were the mayors, based on religious
dominance in Mesopotamian cities.

Sumerians, believing in religious significance, were the first settlers of the
Mesopotamian region. They built large towers on which they placed altars. They
also used rising galleries to mark political, religious and economic city centers
(St.Just, 2010). The altars and temples that dominated the “skyline” became the
center pieces of the urban landscape and Mesopotamian cities (see Figure 4.2).
Not only did temples serve a religious purpose, but they acted as commercial nodes. Some may even call them “the first shopping centers.” Shop owners and traders would sell goods at the base of the temples, or religious structures. Kotkin (2005, p. 5) noted, “…temples stimulated the commercial growth of early cities.”

Some of the most sacred and prominent cities arose from the Mesopotamian lands. These cities include Mecca, Uruk, Nippur, Babylon, and Nineveh. There were other cities that occupied the region, but history reveals the most dominant cities were located along the Tigris and Euphrates rivers. Appendix A shows the comparison of prominent Mesopotamian cities.

**4.2.1 Babylon**
How would Kotkin classify the city’s founding vision?

Babylon was originally designed as a sacred city. In the Semitic language, the word Bâb translates to “gate” and ili translates to “gods.” The city is considered to be the “gate of the gods” (Lendering).

How was the city’s vision influenced?

Most of Babylon’s prestige came during the reign of King Hammurabi. He changed the religious worship to the god Marduk.¹ He constructed the temple Esagila and the ziggurat Etemenanki, which were considered to be the foundation of heaven on earth in support of Marduk (Lendering). It is clear the city’s vision was influenced by King Hammurabi and his religious beliefs. This city was to be a sacred “gate of the gods.”

How has the city’s vision influenced the physical form or built environment?

In an attempt to protect the sacred nature of Babylon, defensive towers were built along the outer wall. The outer wall was then surrounded by a water-filled moat. The inner defensive walls were made of brick and were two rows thick with defensive towers in between. The city has eight main gates. The outside wall consisted of three smaller walls for a total thickness of 32.8 feet.

The streets ran parallel and perpendicular to the river; 24 streets in all. They were narrow, irregular, and ranged from four to twenty-four feet wide. The only

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¹ Marduk was the patron deity of the city of Babylon during the reign of Hammurabi. It is believed Marduk is connected to water, vegetation, judgement and magic.
paved streets led to prominent structures creating a sense of social order (Global Security, 2006).

**How did the city's duration contribute to its sustainability?**

The city was erected from a small town during the third millennium BCE during the era of dawn dynasties. It did not flourish into a great city-state until the first Babylonian Dynasty around 1894 BCE (Global Security, 2006).

The Babylonians were great traders. Thousands of cuneiform tablets revealed their complex trade networks. They traded with Lebanon, Egypt, and Greece, and protected their trade routes with marching armies. Babylonians also understood floodplains to an extent, building levies to protect their religious structures. They were very good at building with the environment rather than against it.

One of the most influential rulers of Babylon, and reason for their sustained success, was King Hammurabi. During his 42 year rule, Hammurabi increased economic ventures, religious affairs, and justice amongst his people. He helped create a working irrigation system from which agriculture surplus was sustained (Global Security, 2006). His understanding of cities led to the rise of Babylon as the prominent city in Mesopotamia, and directly contributed to its sustainability.

**How has the city's social order contributed to its physical form and sustainability?**

The separation of classes in Babylon contributed to its design and physical form. The kings and priests lived near the prominent buildings within the inner walls; whereas, the general public mostly lived between the inner and outer walls.
The strong ideology of religion made the kings and priests want to protect their values by building defensive walls and moat only accessible by gates. This design was aimed at sustaining their civilization and beliefs.

Hammurabi’s Code reveals the Babylonians built walled cities around temples. The location of the temple was in the center of all activity, and it served as the bank for surplus and collective savings. The temples owned land, slaves, artifacts and animals. The built environment was created around the notion of religion and religious practices (Russell).

4.2.2 Uruk

![Diagram of Kotkin Theory Model Uruk]

**How would Kotkin classify the city’s founding vision?**

Uruk, like most Mesopotamian cities, was built on a temple-city model of urbanization (Harmansah, 2010). This model indicates the temple, or religious structure, was the center of civilization and urbanization. It was the center of economic activity, and it was controlled by the kings and priests. Much of Uruk’s success can be contributed to its agricultural techniques; therefore, indicating the
city may have been constructed by economic successes, and governed by religious beliefs.

**How was the city's vision influenced?**

The early Uruk settlement was founded on two separate sacred precincts: E-anna, the “House of Heaven” dedicated to the goddess Inanna, and Kullaba, dedicated to the god An of the sky (Harmansah, 2010).

**How has the city's vision influenced the physical form or built environment?**

The city is divided between two sacred elements, Inanna and Kullaba. The temple for Kullaba was built on the highest ground, since he denotes the sky. The settlements were large in size with the main attractions for commercial and religious activities centered on them. They were protected by walls and towers. Much of Uruk's physical form can be contributed to its sacred elements, and the need to protect them.

**How did the city's duration contribute to its sustainability?**

Uruk was the first major city in Sumer. It was built during the 5th century BCE and was considered one of the most important religious centers in Mesopotamia. It was continually inhabited from about 5000 BCE to the 5th century CE (Steitieh). Much of Uruk’s sustainability can be contributed to their knowledge, craftsmanship, and agriculture. The Uruk civilization was very knowledgeable on irrigation, agriculture, and building techniques. They were very artistic, and utilized their skills to market and sell pottery and art in their economic centers (Harmansah, 2010).
How has the city's social order contributed to its physical form and sustainability?

Social order is kept through religious beliefs. This mentality is consistent with most Mesopotamian cities. Each city had a major patron deity who determined the fate of the city. The ruler was responsible for maintaining order and the belief of their deity, which was usually done through offerings, festivals, and a strong agricultural base. Authority was given to kings and priests, who coincided with the temple. The temple was the main institution for economic gain (Harmansah, 2010). This ideology was directly responsible for Uruk’s sustainability, along with most Mesopotamian cities. The need to protect these sacred entities led to building defensive walls for protection. The protection of a city’s central vision allowed for sustainability.

4.3 EUROPEAN ORIGINS

Europe, rising to power many years after the Mesopotamian cities discussed earlier, created a different sense of identity to direct society and development. Rather than focusing on a religious capacity, European cities idolized “Mother Earth,” and concentrated on becoming the dominant hegemony. Crete, the largest and most populous Greek island, opened the eyes of mainland cities to urban possibilities through the affluence of successful commerce (Kotkin, 2005, p. 19). Appendix B outlines two influential European cities.

Taking cue from the Minoan’s in Crete, the Mycenaean’s were the first major builders in Europe, but their focus was on control and dominance over the region.
People were constantly battling for dominant control, so much that when they were not fighting other civilizations, they were fighting each other (Davies, 1996). This could have been a result of the region they inhabited. “The rocky country of Greece, with its chains of mountains and compact valleys, promoted political fragmentation and discouraged the creation of sprawling city-empires” (Kotkin, 2005, p. 20). With very little means of sustaining through agriculture, conquest may have been their best option for survival. Furthermore, the limitations of city expansion led to building the archipelago. This was true for early Athens and Thebes, too.

The early cities of Greece, although barbaric at times, were very good at creating very individualistic cultures while remaining anchored to the urban mainland core (Kotkin, 2005). The best way to explain Greece in the early stages of development is unruly, and headed nowhere fast. The average Greek cared about himself over everyone else. Greeks had a general disregard for most ideologies at first, until a series of plagues eliminated most of the population.

It is from these catastrophic events, Europe looked to a commercial role under the leadership of Pericles. With the militant force supporting commercial development, Greeks provided the model for new urbanism, converting the “agora” (see Figure 4.5) into thriving marketplaces, setting the precedence for cities like Syracuse to grow (Kotkin, 2005). The new focus was sustainability through commerce.
Europe led the way in technology providing the foundation for Western civilization in language, politics, education, philosophy, science, writing, and the arts (Davies, 1996). Around this time, Rome had established itself as a grand-scale city. Kotkin might argue, a “mega-city.” It was a sprawling city full of marketplaces, temples, beer gardens, aristocratic villas, and crowded streets. The population had grown to more than 1 million, placing it on the same scale as contemporary Tokyo, New York, and Shanghai (Kotkin, 2005). Rome’s success lay in an organized military and religious conviction.

Rome was successful for many reasons, but two standout above the rest; civic mythology and divine mission. Rome did not enjoy some of the geographic luxuries ancient Mesopotamian cities did, nor did they economically stand out above their surrounding counterpart cities. The Romans did however, have a vision, a purpose, directed by god, to care for one another and for the city. Another great vision the Roman’s adopted was codifying their government. They understood the importance of direction and discipline, from relationships between patrons and clients to the
protection of the general public (Kotkin, 2005). It is through these actions that Rome became successful, adopting a sense of divine security for the public realm.

4.3.1 Rome

How would Kotkin classify the city’s founding vision?

Rome was founded on economic success and political reform. Augustus’ leadership allowed Rome to dominate most of Western Europe making it the most politically important, richest, and largest city until it was surpassed by Constantinople (Kotkin, 2005). The influence of religion by the Pope later altered the city’s vision to include a sacred entity.

How was the city’s vision influenced?

According to Kotkin (2005, p. 29), “by 450 BC, Rome codified their government with the Law of the Twelve Tables. The codes covered everything from market days, the relationship between patrons and clients, the rights of aristocrats and protection of plebeians.” It was designed to allow self-regulation through conformity by shaping the behavior of its citizens. This code enabled the city to prosper under the city’s vision.
How has the city's vision influenced the physical form or built environment?

The political influence in Rome led to the creation of public spaces like the Colosseum and Roman Forum. The introduction of religion later transformed the built environment to center around art, poetry, literature, music, education and culture. Places like Vatican City and the Sistine Chapel were being constructed to better foster these new focuses.

How did the city’s duration contribute to its sustainability?

The city is believed to have been founded in 754 BCE by two brothers, Romulus and Remus, from a group of small farmsteads near the Tiber River (Jenkins, Mirza, & Tsang). Much of Rome’s success can be contributed to its location to the Tiber River, making it a natural trade route. The mild climate and decent soil supported farmers and shepherds. Most notably, deposits of salt made Rome a popular city to trade with (Kotkin, 2005). Today Rome contributes its continued success to the service industry, research, banking, and tourism.

How has the city’s social order contributed to its physical form and sustainability?

The city’s code has greatly contributed to its social order and physical form. The importance of public spaces and people helped shape city design leading to increased sustainability. The introduction of religion further strengthened Rome as a capital leading to continued success.
4.3.2 Crete

How would Kotkin classify the city's founding vision?

Crete was founded on an economic basis as a port city. The Minoan’s, Crete’s first civilization, were farmers, shepherds, and merchants (Detorakis, 1986). Crete expanded because of robust international trade, development of irrigation systems, and knowledge of the sea (Kyriakopoulos, 2008).

How was the city’s vision influenced?

The desire to conquer and expand their naval enterprise influenced the city’s vision. The Minoan’s were highly successful fisherman and merchants. They lacked in military experience, but that never stopped them from trying to expand their influence.

How has the city’s vision influenced the physical form or built environment?

Much of the built environment is contributed to the topography of Crete. It is a mountainous island with numerous fertile plateaus, caves, valleys, plains, and gorges (Interkriti). Because Crete is an island, there are many port locations available from which to build cities, and expand their merchant enterprise. The city vision for economic gain and expansion of trade has contributed to most development being built near the low-lying coastal areas.

How did the city’s duration contribute to its sustainability?

Crete dates back to Neolithic times, but is most notably known for the Minoan civilization around 2600 BCE. The major contributors to Crete’s success are from
their marine enterprise. They were excellent merchants who established a naval empire in the Mediterranean.

How has the city’s social order contributed to its physical form and sustainability?

Much of Crete’s social order is rooted in traditions and cultural history. Even with today’s globalization, tourism, and economic growth factors, locals can be seen exercising historic Cretan dances and ceremonies (Interkriti). The rich history has allowed this area to sustain over time. The limitations are more readily identifiable. Since they are landlocked with a mountainous core, development has remained generally fixed. Their control over the sea has also contributed to their sustainability, but volcanic eruptions are believed to have decimated early civilizations.

4.4 ISLAMIC ORIGINS

Nearly a millennium since Rome, when Constantinople remained one of Europe’s last dominant cities, the Prophet Muhammad of Islam began his holy pilgrimage to Mecca (Kotkin, 2005, p. 43). The Muslims had cut off European commerce by taking control of the Mediterranean and the trade routes east. They weakened European urbanism by controlling sources of wealth and knowledge (Barraclough, 1976, p. 61).

The basis for Islamic urban origins rests upon a powerful vision of human purpose (Kotkin, 2005, p. 44). This profound “urban faith” is centered on the
gathering of the community. Cities in Islamic culture are ‘the places where men pray together,’ and are a central theme to Muslim faith (Wheatley, 2001, p. 41).

The dry, unforgiving climate made agriculture uncommon to most Islamic cities, including Mecca, making commerce the basis for economy (Wheatley, 2001, p. 12). Prior to permanent settlements, most Meccan’s were Bedouin decedents who wandered the vast desert searching for grazing land and water. By organizing into clans, they managed to supplement their meager incomes by protecting caravans (Kotkin, 2005, p. 44). Through the formation of clans, Mecca was able to grow into a permanent city. Mecca developed into a small settlement of around 5,000 after the clans started their own caravans, profiting from trade growth between Levant and Yemen (Kotkin, 2005, p. 45).

The lack of central faith and direction is where Muhammad is instrumental to Islam’s sustainability. He directed Arabs to the Koran and Islamic faith. According to Kotkin (2005, p. 46), “This religious orientation, and the attendant laws governed day to day...” activities, conquest and urban life. The growth of trade, arts and science was sparked by the cosmopolitan character of Islamic urban life (Wheatley, 2001, pp. 35-38). It testified to the civic imagination of the new order (Kotkin, 2005, p. 47).
4.4.1 Mecca

How would Kotkin classify the city’s founding vision?

The city of Mecca was founded as an important trade and religious center. It is the birthplace of the Prophet Muhammad and Islam. Mecca is home to the Ka’ba, Islam’s most holy site. The central vision for Mecca is to promote Islamic culture and provide a sanctuary for the Hajj (Gray, 2009).

How was the city’s vision influenced?

Religion, mainly the Ka’ba, is the major contributor to the city’s vision. It is regarded as so holy that no matter where in the world a Muslim is, they must face and pray in its direction. Furthermore, Saudi law forbids non-Muslims from entering Mecca (Hyland, 2009). The central focus is the Ka’ba, and it remains safeguarded from all non-Muslims.
How has the city's vision influenced the physical form or built environment?

The Ka’ba is centrally located within defensive walls in the center of Mecca. It has remained a centerpiece and sacred entity since its original development. Commercial activity has improved along with security, but this city remains an early model city from Kotkin perspective.

How did the city’s duration contribute to its sustainability?

The story of Mecca’s development or creation is somewhat of a mystery. Some accounts believe Mecca was first established when Adam and Eve were cast out from Paradise. The story continues to say when Adam was separated from Eve he was cast on the mountain top and built the Ka’ba as he was ordered from God (Hyland, 2009). The great flood then erased it form the face of the earth only to be rebuilt later.

Most historians believe the Ka’ba was built by Abraham and his son Ishmael around 2,000 BCE. Regardless of the actual event in history, Mecca has been in existence since around 2,000 BCE, and still has functioned in a similar manner since its inception.

Much of the city’s success remains in its sacred origins. It is Islamic culture’s most sacred site and center for all Islamic worship. Since the 4th century CE numerous pilgrims arrive to perform the hajj, and the economy is heavily dependent on this religious journey. This has been true since the beginning of time. Its effects can be seen in the entire Hijaz and Najd regions Income is generated when pilgrims
are taxed and locals provide services to pilgrims through transportation fairs, hotels and lodging, and food services. The increase in technology, convenience, and affordability of plane travel has increased the number of pilgrims participating each year, thus increasing economic growth (Gray, 2009).

**How has the city’s social order contributed to its physical form and sustainability?**

Meccan social hierarchy is based on a religious structure, where God is the supreme ruler. There is a general concentric circular, or tier, system with higher class individuals near the inner sanctuary area moving outwardly as the income/social class decreases. This social order has led to safeguarding the central vision, the Ka’ba. The strict governance of the Islamic religion has controlled development and contributed to its sustainability as a religious city.

**4.4.2 Jerusalem**

![Figure 4.8 Kotkin Theory Model Jerusalem](image-url)
How would Kotkin classify the city's founding vision?

The city was founded on religious beliefs when King David took a hill town from the Jebusites (Binz, 2005). The three main religions – Judaism, Christianity, and Islam each have significant contributions to the city's vision.

How was the city’s vision influenced?

Jerusalem is Israel's largest city and home to three major religions – Judaism, Christianity, and Islam. Each religion sees this city as holy, but for different religious reasons, during different time periods. (Hoppe, 2000).

How has the city's vision influenced the physical form or built environment?

The religious background has led to major tourist attractions and increases in service related industries. The built environment has been designed to meet the needs of religious travelers. During the British Mandate, laws forbade the construction of buildings unless it used Jerusalem stone. This was an attempt to preserve the unique historic and aesthetic character of the city. In turn, it has deterred heavy industry from construction and led most workers to markets and manufacturing (Dumper, 1983).

How did the city's duration contribute to its sustainability?

The old city was settled in the 4th millennium BCE, making Jerusalem one of the oldest cities in the world (The American-Israeli Cooperative Enterprise, 1999). Much of its success can be linked to its religious significance and tourist attraction. It is referenced in the bible numerous times.
How has the city's social order contributed to its physical form and sustainability?

The city is protected by a wall over 13,000 feet long with seven gates, 34 towers, and a citadel. The city is further divided into four residential quarters: the Armenian Quarter, smallest quarter that houses the Armenian Patriarchate; the Christian Quarter, with more than 40 churches, monasteries, and hostels, including the site where Jesus was crucified; the Muslim Quarter, the largest quarter hosting the most sacred site for Jewish followers; and the Jewish Quarter, host to the Western Wall, Wailing Wall, and Holy of Holies (Ministry of Israel, 2005). The division and acceptance of three major religions has made this city a tourist attraction; making Jerusalem economically viable and contributing to its sustainability.

4.5 ASIAN ORIGINS

In contrast to Islamic cities, Asian cities rose from a predominantly agricultural framework. Asian cities were considered some of the best-planned cities by embracing the agrarian reality. Despite having the world's largest population, China was unable to fully urbanize as a country. Agriculture was consumed at the local level.

The most important cities in China served as administrative centers for the empire. It was bureaucracy, priestly functions, and the military that had leading roles, while commerce and craft played secondary roles for the elites (Kotkin, 2005, p. 53). It was politics that propelled Asian cities like Beijing, Chang'an, Nanjing, and
Kaifeng. It wasn’t until the end of the first millennium CE that Asian cities shifted from political dominance to commercial enterprises. By lifting traditional regulations on trade and land, Asians emerged as urban proprietors.

4.5.1 Beijing, China

How would Kotkin classify the city’s founding vision?

Beijing was founded as a political city rooted by imperial capitals. The city is known for its political, educational, and cultural centers. At its core, the Forbidden City stands, protected by defensive walls. The city originally started from small scale settlements focusing on basic agriculture and animal husbandry, only to grow into a global city.

How was the city’s vision influenced?

Much of the founding vision was influenced by the imperial household. The ruling class designed the city to meet the needs of the emperor. The Yuan dynasty developed the streets and grid pattern while the Ming and Qing dynasties focused on cultural aspects. The city design remained protective of the imperial household regardless of the dynasty.

How has the city’s vision influenced the physical form or built environment?

There were two imperial schemes for the built environment which revolved around the imperial household. The protection of the imperial household was a major contributor to the city’s vision; therefore, careful planning was essential to city sustainability.
It was regarded as a three-dimensional design in which the soaring palaces, pagodas, and gateways were laid down amidst low-lying houses to achieve special effects. The wards in the city were enveloped by the main thoroughfares so that the neighbourhoods became enclaves free of traffic. At the same time, infinite variations of form and colour were created within a simple gridiron framework. The gateways, together with the surrounding landscape and streets, composed unique picturesque scenes (Liangyong, 1999, p. 10).

Figure 4.9 Physical Form and Structure of Beijing

Much of the city’s rich character has been developed by different imperial families. As mentioned earlier, Beijing’s street system is characterized by the Yuan dynasty. It divided the city into many blocks with mains streets running north to south. The original layout of buildings was clear and definite. Commercial buildings
were planned on busy thoroughfares while residential buildings were on narrow, quiet streets.

**How did the city’s duration contribute to its sustainability?**

Beijing traces its lineage back to the early third century BCE when the first Emperor of Qin conquered six states and unified China (China.org.cn). Much of its success and sustainability can be contributed to the construction of city walls, moats, and canals. Beijing, like most Chinese cities, was completely planned. There were two ancient schemes for imperial capitals; the palace at the center, or the palace centered on the north city wall (Kostof, 1991, p. 175). “Beijing, as the most precious piece of Chinese architecture and planning heritage, should continue to provide us with inspirations in planning and design” (Liangyong, 1999, p. 10).

**How has the city’s social order contributed to its physical form and sustainability?**

The elites were cut off from the surrounding population by thick, high walls. Kotkin (2005, p. 25) argues, “The need to separate the imperial household from the outside world dominated the planning process.” Each great capital was designed for the imperial households (Kostof, 1992, p. 74). The formula was walls, strict grid systems, market districts, and an exclusive self-sufficient district entirely for the emperor, chief ministers, and other imperial household members (Latourette, 1962, p. 80). Social order was regulated by imperial bureaucracy. The sense of social order and strong heritage helped sustain Beijing’s central identity allowing them to prosper throughout time.
4.5.2 Angkor Wat

How would Kotkin classify the city’s founding vision?

It is difficult to categorize Angkor Wat’s founding vision. Most scholars believe Angkor Wat was built to model sacred geography from archaic times. Some believe the city was a result of strategic military position and agricultural potential (Gray, Angkor Wat, Cambodia, 2009). It may have been a combination of all aspects. These factors would clearly be an indication of Kotkin’s theory of sacred, safe and busy creating a universal experience.

How was the city’s vision influenced?

The Hindu god Vishnu is responsible for King Suryavarman II religious temple. It is considered the world’s largest religious building (HB, 2008). It is believed to mirror the constellation Draco and be a temple for burial ceremonies.
How has the city's vision influenced the physical form or built environment?

Those scholars who believe this site is based on sacred origins would argue the city's vision greatly contributed to the physical form of Angkor Wat. Through computer simulation archeologists have been able to identify the ground plan for a complex set of mirrors which illuminate (or recreate) the constellation Draco during the spring equinox. It is believed this alignment is meant to harmonize the earth and the stars (Gray, Angkor Wat, Cambodia, 2009).

How did the city's duration contribute to its sustainability?

The city's duration is short lived. It is believed the city was built by the Khmer civilization between 802 and 1220 CE. There is much debate over Angkor Wat, as Kostof believes a city is a place made up of people and buildings, and some research indicates the area was used as a sacred area rather than a residential one. It is believed to be a community of religious structures and persons, a destination for pilgrimage. This could have been the reason for its abandonment or disappearance.

How has the city's social order contributed to its physical form and sustainability?

The vision for Angkor Wat portrays a religious significance; therefore, social order was maintained by religious code. The central vision or identity for this area was worship. The physical form was designed for religious practice and the Khmer civilization utilized stones to preserve its form. The houses that were present were constructed of wood and have deteriorated since the fall of the Khmer civilization.
4.6 MEGA CITIES: Soleri’s Vision of an Ecologically and Socially Sustainable City

This section aims to provide a general framework of Arcologies from the mind of Paolo Soleri. His thoughts and creations challenge the fabric of society we live in today. Soleri’s theories are consistent with those of Kotkin and Kostof. Each Arcology has a vision that directs its purpose; farming, harvesting, manufacturing, industry, research, etc. Arcologies are centers for energized crowding and activity. They relate to the countryside by preserving natural resources and providing for a differentiation of uses. Soleri’s literature and theories can be summarized into the following: 1) Megacities can be built in any region, and 2) there are simple fundamentals needed in each city.

4.6.1 Megacities and the Built Environment

Soleri’s concept sketches of 30 different Arcologies demonstrate that a geographic region does not limit the built environment. His concepts take form in places like the continental shelf, open sea, coastal regions, cliffs, farmlands, hilly areas, flat areas, and even outer space. The built environment is limitless in the mind of Soleri. Perhaps his concepts have dubbed him mentally unstable, but it is from outrageous thinking some of the most innovative and creative inventions have come to life.

The Arcvillage 1, designed to be built on farmland, can support a population of 9,000 in a surface area of only 30 acres. The density for this structure is 300/acre. In this concept, at the core is the urban environment. Soleri (2006, p. 66) envisions,
The farming proceeds from the village to the open countryside with (1) vegetable gardens at the foot of the arcology, to (2) gardens, to (3) orchards, to (4) grain farming. Canals are fed by a water reservoir, and they loop inside the arcology, irrigating the vegetable gardens.

There is a natural pulsation of life. Some people would live and work on the farms while others would live and work outside the central core, perhaps in another city, returning to the core at the end of the day. The central focus of Arcvillage I is farming, and it is intricately designed into the urban built environment. A total ecology must be obtained. Figure 4.11 shows how the structure would function with the environment.

Figure 4.11 Arcvillage I
Data Source: (Soleri, 2006, p. 64)
The concept Novanoah II brings urban life to the open sea and/or continental shelf. This arcology can sustain a population of 2.4 million in as little as 6,900 acres; 345/acre. Its primary functions would be harvesting from the sea, research and housing (Soleri, 2006, p. 50). Figure 4.12 shows Novanoah’s relationship to the natural environment.

**Figure 4.12 Novanoah I**
Data Source: (Soleri, 2006, p. 47)

### 4.6.2 Fundamentals Needed in an Arcology

In all of Soleri’s designs a few consistent ideals can always be found. For instance, a city must possess an operational vision. This could be farming, as seen in Arcvillage I, or sea harvesting, as seen in Novanoah II. The city must serve a purpose.

Additionally, the city must serve its residents. Each concept identifies living, working, and recreational areas. There are markets for shopping, neighborhoods for group identifying, cultural centers for religion, and industry for working and
production. Furthermore, city centers are envisioned to provide places for government, education, and social gatherings.

Figure 4.13 Novanoah II
Data Source: (Soleri, 2006, p. 50)

4.6.3 Summary

Housing, factories, schools, governmental buildings, and other development types can be designed into an arcology. Parks can be integrated into the design, just as nature should be. Soleri envisions close-knit societies that serve each other and the city, just as the city serves its residents. Designs are creative, taking technology to the next level. Design conforms to the natural environment with as little disruption as possible. Arcologies apply miniaturization and adaptability into design, but the designs are not as important as the harmony between man and man, man and nature, and nature and the city.
4.7 CONCLUSIONS FROM CASE STUDIES

After researching the above cities and regions, five conclusions can be drawn: 1) topography sets the scene for city sustainability; 2) cities need to be protected; 3) there is a focal point present in cities; 4) social order must be accepted for a city to sustain; and 5) social hierarchies are a significant determinant of urban form. Each of these five aspects was demonstrated by the case studies above [see Appendix E]. They form a basis for city sustainability. Like the roots on a tree, they form the roots of city sustainability [Figure 4.14].

![Figure 4.14 Roots of a City](image)

**Typography sets the scene for city sustainability.** One of the most influential aspects of urban form, aside from religion, was topography. Babylon and Uruk became powerful by utilizing the Euphrates and Tigris Rivers. Rome set the stage by creating the Roman Forum between the Palatine and Capitoline hills.
Topography also creates a natural barrier of safety. The Romans used the Mediterranean Sea as a defensive wall until piracy threatened their city. Often cities were built in regions protected by mountains, or on harbors for merchant trade.

Topography sets the stage for agriculture potential. The fertility of the land allows food to be grown and feeds the animals. The abundance of fertile land for agricultural purposes allows surplus within the city. Topography plays an important role in city sustainability.

**Cities need to be protected.** The earliest civilizations learned protection is essential to city sustainability. The Babylonians, Romans, Muslims and Asians all realized the need for protection, and built defensive walls, barriers, and moats. These civilizations utilized the natural environment to safeguard their cities and religious ideologies. Once the city’s defensive walls were destroyed, the city fell. This was evident in places like Babylon and Uruk.

**There is a focal point present in cities.** They provide a catalyst for commercial and social activity. Each city presented above had a focal point. Majority of the time it was a religious structure that united the city, and dominated the landscape. A focal point, or central vision, brings a civilization together. More often than not, the focal point was used in ceremonies, festivals, and commercial activity. The focal point in Babylon was the ziggurat. The ziggurat was the location for many festivals, merchants, and religious ceremonies. The Ka’ba is the center of the Islamic religion. Regardless of their location on Earth, all Muslim’s face the Ka’ba during prayer.
**Social order must be accepted for a city to sustain.** The major downfall for the Mycenaean’s was their lack of social order. Instead of codifying their laws like the Babylonians or Romans, they attempted to create order through fear. Social order is a root of city sustainability. Each case study demonstrated knowledge of this concept by creating a social hierarchy or governing law to sustain and prosper.

**Social hierarchies are a significant determinant of urban form.** The cases studied demonstrated how social order and social class contributed to urban form. The elites lived in the most luxurious areas, surrounded by the highest quality amenities. Palaces were given grand entrances. The elites, emperors, and kings were separated from the common worker. They were typically protected by defensive walls within outer defensive walls. The ruling class often built the city in their vision. Each case demonstrated how conquering civilizations contributed their “flare” to city development. A city’s urban form is significantly influenced by social status and social hierarchies.
CHAPTER 5
SUMMARY CONCLUSIONS

5.1 INTRODUCTION

The studies conducted in this thesis outline strategic advantages to the sustainment of a city and civilization. One cannot ignore the fundamentals that have allowed cities to sustain for thousands of years; fundamentals like Kotkin’s sacred, safe, and busy theory, or Kostof’s nine characteristics of cities.

It can be noted that most cities need to be protected. As cities become the dominant centerpiece in a region, their presence brings apprehension from neighboring cities that will either fear being overtaken, or desire to dominate the potentially growing threat. Another purpose for safeguarding a city is to protect the central identity.

Research has concluded most cities were created around a central function, whether it was a ziggurat honoring a god, or a tree stump of significance, the desire to protect it remained. It could resemble ideas taken from a childhood game “capture the flag.” Once the “flag” is captured, the game is over; the city fell. Kotkin (2005, p. 11) wrote, “Once nomadic raiders could penetrate the city walls...early civilization collapsed.” After a capture, it would be the option of the new ruling entity to either rebuild or abandon the city.
European cities focused attention on conquest and commerce. It would appear their lack of religious affiliation had a negative effect on the stability of their cities, but this is not the case. It was not their lack of religious affiliation; it was their lack of central identity. Commerce alone is not enough for city sustainability. One great aspect of religion is that it directs focus to a single entity, or group of entities, thus creating a hierarchy from which to govern. Rome became semi-successful, at least more successful than its Greek counterpart Crete, by developing a governing system from which to control social order. From this principle, cities can function with less fear, placing more emphasis on functionality and sustainability.

This conclusion aims to provide the “best practices for future development of cities” by examining those fundamentals present in historic cities and the future concept Arcology.

5.2 ORGANIZATION

To conclude this research-based thesis, the final chapter will be organized and outlined by summarizing the material presented in previous chapters and by addressing the three questions outline in Chapter 1. It will finish with an introduction to the “time-space model of understanding cities,” followed by “best practices for future development of cities,” and finally by providing direction for future research.
5.3 SUMMARY QUESTIONS

Q1: How is sustainability addressed in the universal experience of cities?

The universal experience of cities calls for a central identity, protection, and a busy economy. Cities that have a central identity typically have the ability to govern themselves. The citizens feel empowered to safeguard that identity, which could be religious or patriotic. The concept is having something to fight and live for. A central identity provides and encourages camaraderie amongst the population. This has been evident throughout history. Prior to Crete having a central identity, they lived a less than sustainable lifestyle, stuck in an earlier development stage, unable to move forward. They were trying to conquer everything and everyone, but they could not sustain with that mentality. In contrast, cities like Rome, which developed with great meaning, were able to prosper. The most notable form or meaning came from a written set of standards, which was seen in many cities throughout time.

Security was another important factor in sustainability, and the universal experience. History has proven that cities need to safeguard their central identity. Most of the time safeguarding the central identity meant protecting a temple or structure. This was mostly accomplished with the use of defensive walls, but as invasion became less of a threat than unruly citizens, the focus changed. The threat from interior exploitation created the need for policing and having “eyes on the street.” New forms of protection were warranted. Protection of the developed city and its identity is essential to the sustainability of the society. Safety will always
remain a central principle in long-term viability. Once a central identity is lost, the city will fail. All hope will be lost.

The final leg in the universal experience of cities is a busy commerce. One objective of Smarth Growth is to balance commerce and equity. This is outlined in the “Three E’s of Sustainability.” Environmental quality, economic vitality, and equal opportunity create the foundation for democratic planning.

Historically, the people with the most money had the power to control the land. They ruled the city and determined its fate; however, the Romans laid the framework for public places and equal rights. As great administrators, the Romans emphasized planning for the people by creating public places and social order. In present-day America, the people with the most money attempt to control the land; however, there must be a balance between commerce and equity. Organizations like the National Low-Income Housing Coalition and the Equal Employment Opportunity Commission allow the historically repressed groups to have an equal opportunity. Democracy allows community members the opportunity to create rules and principles, which create a framework for modern-day planning and zoning.

**Q2: How does the physical form and social order affect the universal characteristics of cities?**

Just as the natural environment can control how cities take shape, so can the built environment. The built environment helps direct and determine a social hierarchy. Research indicates that a social hierarchy is needed. People need rules and governing bodies to prevent utter chaos. The built environment helps create
that hierarchy. It has been observed throughout history, that most sacred elements were located in the center of the city, the safest region. If the safest region is in the center of the city, typically the rulers and elites lived near there. Today the elites live in the nicest areas. They have the money to gentrify areas; therefore, not only does the built environment control social order, but the natural environment does too.

In ancient cities, to protect something a ruler built a wall. Today, the elites build gated communities. Gated communities keep the “unwanted” or “lower class citizens” out. It is not that gated communities are bad, even Soleri could argue segregation is acceptable, but the means of doing it can be controversial. Soleri envisions miniaturization, but if one looks closely at his designs, he has neighborhoods incorporated. People want to live around people who share common interests (i.e. social class, gender, religious preferences, etc.), so community identity should be incorporated into the design of cities. Soleri tries to close the physical gap between communities by living in more closely knit neighborhoods/communities.

One of Kostof’s nine characteristics is written records. Written records are historical documentation and codes of conduct. The codes of conduct help define social interaction, commercial enterprise, and safety. Social order helps direct city form and the placement of significant buildings. Today, written records are documents of land-use, comprehensive plans, and future visions. They help direct a city’s design; therefore, contributing to its vision and universal characteristics.
Q3: How does a city’s form and social order contribute to its sustainability?

A city’s vision helps determine social order and design. It helps control the population by providing a framework from which to govern its people and practices. Kostof would argue the function of economic purpose would determine urban form. Organic cities evolve from economic venture and social patterns. Historically, cities centered their commerce on the central identity. It was a place for social gathering and community activity. The elites were concentrated near the central identity. They were intimately involved in controlling the citizens. The cities form will center on socially accepted places of importance. In Rome, places like the Colosseum, Roman Forum, and agora were centers of social activity and urban form. Their busy nature allowed for continued economic and social success, and promoted sustainability.

In Soleri’s Arcologies, social order dictates design. The design and social order together significantly contribute to a city’s sustainability. His concepts try to reduce the negative effects of sprawl, bring communities closer together through diversity, and care for the natural environment by preserving its duration. In following these principles, longevity is achieved, and a city can sustain.

5.4 TIME-SPACE MODEL OF UNDERSTANDING CITIES

The time-space model of understanding cities originated from integrating concepts and theories presented by Kostof, Kotkin, and Soleri. Cities naturally change over time. Their spaces are altered by a new vision which directs the evolution of space. Space and vision have a symbiotic relationship. One can be a
catalyst for, and influence, the progression of the other. Such a model takes theories presented by Kostof, Kotkin, and Soleri, and demonstrates how time and space relate to a city’s design and universal experience.

The central theme for this model is to show how cities develop over time. A city could start its early origins with a sacred entity directed by safety, (reference 2000 BCE in model) then it could shift away from a religious ideology to primarily focus on safety (reference 500 CE). Over time, as cities evolve, it may shift towards commercial enterprise. Figure 5.1 demonstrates how a city may shift its vision, influencing design in an attempt to promote and encourage sustainability.

![Time-Space Model of Understanding Cities](image)

**Figure 5.1: Time-Space Model of Understanding Cities**

### 5.5 BEST PRACTICES FOR SUSTAINABLE CITIES

The direct focus of this research-based thesis is to provide principles to guide future planning and development of cities. It demonstrated how the universal
experience of cities and social order contribute to sustainability. With this knowledge six principles are presented to guide future development.

1) **Miniaturized.** Cities need to be compact. Soleri addresses this topic intricately with his philosophy of miniaturization. Mankind needs to stop attacking the environment by surface building. The city should build higher, and increase density to account for growing populations. Physical form cannot continue to sprawl outwardly otherwise it will destroy the planet as presented by Doxiadis in the pulsatory “map of despair.”

In order to miniaturize, society must become united. There must be a conscious effort to reduce the development of sprawling communities. Early cities miniaturized their development using defensive walls. They created districts that were close to each other. They didn’t allow their development to sprawl outside the boundaries they could keep safe.

Ecological footprints must be reduced. Miniaturizing means creating walkable or multimodal transportation networks. It requires concentrating development to specific areas through programs like growth boundaries. Miniaturization requires reducing minimum setback requirements and square footage minimums. It means sharing public and private amenities such as automobile parking and open space. These are all goals that can be accomplished through zoning and ordinance changes.

2) **Integrated.** Physical form must be integrated into nature to ensure sustainability. Doxiadis’ “map of despair” shows the destructive impact mankind has on the natural environment. Society must learn to build with nature rather than
against it, and utilize its resources without over-consuming them. This is an
apparent approach in Soleri’s Arcvillage I and Novanoah II.

Integrating urban form and nature will promote sustainability. Development
should complement the natural environment, almost as if it were originally part of
the natural growth. Beijing was very good at integrating nature and urban form.
Beijing was an agricultural community for many years before commerce redirected
their vision. Angkor Wat was fully integrated into the natural environment,
surrounded by wooded areas. Early cities also utilized natural features to protect
their citizens and sacred ideologies. Figure 5.2 shows an artist’s depiction of an Eco-
San Francisco where the physical environment is integrated into nature.

Understanding the unique environmental qualities of a specific area (i.e. each
region’s agricultural suitability) is the first step in accomplishing an integrated
physical and natural form. When communities and countries work together to
accomplish a unified goal or vision, integration becomes natural.
3) **Adaptable.** Cities change with time. As new rulers conquered cities, they changed social order and physical form. Each new ruling class in Babylon, Rome, Beijing, and many others have adapted the cities vision and uses. Rome demonstrated adaptability when it changed the agora from a public meeting place to a marketplace. Today, new governing official’s change city operations in similar manner. They also modify the direction in which revenue is generated and spent. This changes a city’s vision; therefore, cities must be adaptable.

Kostof addressed this concept in his nine characteristics of cities. He argued cities must allow for a differentiation of uses. Research indicates cities must also allow for adaptability of uses. Design should be flexible and adaptable for new purposes, activities, and uses. The development of single-use buildings needs to stop. This will help eliminate eye sores like dead malls and abandoned structures.

Adaptability allows abandoned buildings to be reused. Property ownership constantly changes. Allowing development to build unique buildings, that cannot accommodate a radically different type of use, goes against adaptability. This does not mean all buildings must look alike, but they should be designed in a way that accommodates multiple uses.

One program used today, adaptive reuse, looks to reuse abandoned development by changing it into usable space. Places around the country are learning how to reuse abandoned warehousing by updating and converting them into lofts and apartments. Figure 5.2 demonstrates how Richmond, Virginia was able to adapt an old ice box plant into contemporary condominiums.
4) **Communal.** Cities need to be communal. Society will inevitably form cliques or common groups. It is mankind’s nature to surround himself with people who share common interests. Being communal means bringing separate communities closer together by working towards a common goal.

Under new leadership Crete was able to change its focus and redirect its vision which led to increased sustainability. By changing the physical form to more miniaturized cities, society becomes more communal. Creating a strong sense of community and family will help strengthen any city. A society who works and lives together will stay together.

Rather than gentrifying areas and segregating communities, planners need to facilitate more diversity and closer proximity. Not every community must be completely diverse, but the distance between social classes should be reduced. For example, a low-income neighborhood should be within a short walking distance to a high-income neighborhood. This helps facilitate communal cities.
Another method of creating communal cities is by facilitating community events like concerts, festivals, and meetings. The Babylonians and Romans did this very well. Increasing community activity is a catalyst for creating and sustaining communal cities.

5) **Connected.** Cities need to be connected. They should allow for multi-modal transportation. Today’s civilizations will not sustain if they continue to build for the automobile. Although a form of connectivity, transportation has become the dominant discourse. There needs to be an integration of alternative connection between associated nodes. Soleri’s Arcologies provide a method of integration.

Arcology calls for connected uses and structures, which reduces the ecological footprint. Reducing the ecological footprint allows enhanced connectivity, preservation of the natural environment, and sustainability. Society must enhance global connections through physical means like transit, and social means through communication. There needs to be a more unified vision between developed, developing, and undeveloped countries. Connected cities have multiple modes of connectivity.
Kostof believed cities are intricately involved with the countryside and its residents. The city has a relationship with the region, and it is part of a constellation of cities. Babylon and Uruk were located on important trade routes and rivers; whereas, Angkor Wat was isolated from the urban hierarchy of the world. This was one of the determining factors for Angkor Wat’s failure as a city. Connection is an integral part of sustainability. A connection with the countryside must be present to allow surplus. The connection between the countryside and the city became the “cradle of civilization.”

6) **Productive.** Society has been mostly destructive since early origins, which has led to the fall of many civilizations; therefore, cities need to be productive rather than destructive. The natural environment and its resources are being consumed faster than they are being regenerated. By integrating the other principles listed above into a community, or comprehensive plan, the environment can start to regenerate. Advancement in technology and changes in social behaviors will generate productive cites, and allow for sustainability.
5.6 ORGANIZATION OF FUTURE RESEARCH

The focus of this research was directed towards examining city origins to understand the universal experience of cities in an attempt to provide alternatives to destructive building habits. The next step is research how contemporary city design and identify can lead communities to a regenerative vision of the future. Kostof provided a framework of contemporary city development with the nine characteristics of cities. Applying the "best practices for sustainable cities," as presented in this research-based thesis, to a contemporary case study of a metropolitan region can help modern-day planners determine possible future actions that will promote sustainability. The framework of such continued research would be:

1. To create goals and objectives that overlay a sustainable vision for a metropolitan region using the “best practices” presented in this research-based thesis;
2. Develop strategies and related policies based on sustainable visions, goals and objectives for the region; and
3. Demonstrate how to implement such policies in local zoning codes and long-range planning documents.
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APPENDIX A: EXPECTED POPULATION 2025

GLOBAL POPULATION DENSITY, PROJECTED TO 2025

Data Source: United Nations Johannesburg Summit 2002
APPENDIX B: AGRICULTURE LAND USE

Data Source: United Nations Johannesburg Summit 2002
### APPENDIX C: MESOPOTAMIAN REGION TABLE

<table>
<thead>
<tr>
<th>City</th>
<th>Period</th>
<th>Population</th>
<th>Central Identity</th>
<th>Significant Location</th>
<th>Additional Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uruk</td>
<td>4000-2000 BCE</td>
<td>50,000-80,000</td>
<td>Anu Ziggurat</td>
<td>East of Euphrates river</td>
<td>Large population base and expertise in agriculture production allowed for artisans to make and sell pottery, mosaics and other small items.</td>
</tr>
<tr>
<td>Babylon</td>
<td>3000-650 CE</td>
<td>200,000</td>
<td>Ziggurat; The Etemenanki; Hanging Gardens</td>
<td>Canal situated off Euphrates river.</td>
<td>Based on agriculture and trade. Created written code to govern city and citizens. Name means &quot;gateway to god&quot;</td>
</tr>
<tr>
<td>Nippur</td>
<td>5000 BCE - 800 CE</td>
<td>40,000</td>
<td>Ziggurat; temple of Enlil</td>
<td>Canal situated off Euphrates river.</td>
<td>Distinctively a sacred city. Originated from reed huts in the marshes. Pottery artisans and remarkable builders</td>
</tr>
<tr>
<td>Nineveh</td>
<td>5000 - 612 BCE</td>
<td>100,000-150,000</td>
<td>Worship of Ishtar; Palace without a Rival&quot;</td>
<td>Tigris River</td>
<td>Constructed elaborate system of canals to funnel water from the hills to the city. Home of the Assyrian king. Disappeared with almost no trace of existence.</td>
</tr>
</tbody>
</table>
# APPENDIX D: EUROPE REGION TABLE

<table>
<thead>
<tr>
<th>City</th>
<th>Population</th>
<th>Known For</th>
<th>Significant Location</th>
<th>Additional Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crete</td>
<td>unknown</td>
<td>Classical urbanity; vibrant commercial culture and highly naturalistic art; trading city</td>
<td>Mountainous Greek island in the Mediterranean Sea</td>
<td>Considered the first advanced civilization in Europe. Largest and most populous Greek island. City was protected by high defensive walls. Boosted urban revenue through real estate sales. Historically a farming/fishing economy - now a tourist/service economy</td>
</tr>
<tr>
<td>Rome</td>
<td>1 million</td>
<td>Public works planning; Vatican City; Roman Forum; philosophy; government</td>
<td>Built in central-Italy on the Tiber river. Constructed on 7 hills.</td>
<td>Seat of the Roman Catholic Church, Vatican City and regarded as one of the most beautiful cities in the ancient world. Reimagined the public works department.</td>
</tr>
</tbody>
</table>
## APPENDIX E: KEY FINDINGS MATRIX

<table>
<thead>
<tr>
<th>Questions of Inquiry</th>
<th>Selection criteria from reading (top “fundamentals”)</th>
<th>Short list of Case Study Cities (that have been sustainable - longevity) *Listed in no particular order.</th>
<th>Key Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1: How is sustainability addressed in the universal experience of cities?</td>
<td>1) Sacredness of cities 2) Safeness of cities 3) Commercial cities 4) Duration of existence</td>
<td>1) Babylon 2) Mecca 3) Angkor Wat 4) Jerusalem</td>
<td>1) Topography sets the scene 2) Cities need to be protected</td>
</tr>
<tr>
<td>Q2: How does the physical form and social order affect the universal characteristics of cities?</td>
<td>1) Design of cities 2) City in relation to countryside 3) Urban Hierarchy</td>
<td>5) Beijing, China 6) Damascus 7) Delhi, India 8) London, England</td>
<td>3) Every city has a focal point 4) Social order is needed</td>
</tr>
<tr>
<td>Q3: How does a city’s form and social order contribute to its sustainability?</td>
<td>1) Location of central identity 2) Cities vision today 3) Social Hierarchy</td>
<td>9) Rome, Italy 10) Crete</td>
<td>5) Social hierarchy determines urban form</td>
</tr>
</tbody>
</table>